

## PHYTOCHEMICAL SCREENING AND TLC FINGERPRINTING OF VARIOUS EXTRACTS OF RHIZOMES OF NUPHAR LUTEUM

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### ABSTRACT

Nuphar luteum (Yellow water lily) is an aquatic plant of the family Nymphaeaceae, native to temperate regions of Europe, Northwest Africa, and Western Asia. The root is astringent, demulcent and anodyne. The present study deals with phytochemical screening and thin layer chromatographic (TLC) fingerprinting of (petroleum ether, chloroform and methanol extracts) Nuphar luteum rhizomes. In phytochemical screening determination maximum diversity of chemical constituents were found in methanol extract of rhizomes of Nuphar luteum. Thin layer chromatographic (TLC) fingerprinting studies showed that all the three extracts i.e petroleum ether, chloroform and methanol extracts of rhizomes of Nuphar luteum contains phytochemical components which were determined by R<sub>f</sub> ( Retention factor ) values.

**KEYWORDS:** Nuphar luteum, Nymphaeaceae, Phytochemical, Retention Factor, TLC Fingerprinting

### INTRODUCTION

Nuphar luteum (Yellow water lily) is an aquatic plant of the family Nymphaeaceae, native to temperate regions of Europe, Northwest Africa, and Western Asia<sup>1</sup>. The dry rhizomes of Nuphar luteum have yielded three sulphur containing alkaloids: thiobinupharidine, neothiobinupharidine and nuphaleine (C<sub>30</sub>H<sub>42</sub>O<sub>4</sub>N<sub>2</sub>S)<sup>2</sup>. The root is astringent, demulcent and anodyne. Alcoholic extracts of Nuphar luteum exhibits strong antibacterial and tumour inhibiting properties<sup>3</sup>. From the review of literature it was found that no work was carried out on phytochemical screening and thin layer chromatography fingerprinting of various extracts of rhizomes of Nuphar luteum. So this study was carried out to explore this area of research of plant.

### MATERIALS AND METHODS

#### Collection and Extraction

The rhizomes of Nuphar luteum were purchased from Natural Botanicals Ghaziabad in July 2013 and were authenticated by the Dr. Sunita Garg, chief scientist of CSIR- NISCAIR, New Delhi. A voucher specimen (NL-1) was deposited in the departmental herbarium of G.H.G Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana, Punjab. The rhizomes were dried in shade and coarsely powdered. Dried coarsely powdered rhizomes of Nuphar luteum (100g) were successively Soxhlet extracted with petroleum ether, chloroform and methanol until extracts were obtained. Then each extract was filtered and the filtrates were concentrated under reduced pressure (Rotary vacuum evaporator). The percentage yield of the concentrated extracts were calculated and then the extracts were subjected to phytochemical screening and thin layer chromatography fingerprinting. Plate 1 represents the photograph of rhizomes of Nuphar luteum



**Plate 1: Rhizomes of Nuphar luteum**

### Phytochemical Screening

The petroleum ether, chloroform and methanol extracts were screened for various classes of phytoconstituents such as alkaloids, glycosides, terpenoids, steroids and triterpenoids, saponins, tannins and polyphenols, coumarins, flavonoids, proteins, amino acids, vitamins, carbohydrates and starch using standard protocol<sup>4,5</sup>.

### Thin Layer Chromatography Fingerprinting

Ten milligram of each concentrated extract was dissolved separately in 3ml of respective solvents, so as to make solutions of the extracts, which were loaded using 2 microlitre capillary tubes (CAMAG) on Merck precoated aluminium TLC plates, silica gel 0.2 mm.

## RESULTS

Table 1 shows the percentage yield of petroleum ether, chloroform and methanol extracts

**Table 1: Yields of Various Extracts of *Nuphar luteum* Rhizomes**

Extract	Yield ( %w/w )
Petroleum ether extract	1.84
Chloroform extract	6.88
Methanol extract	45.64

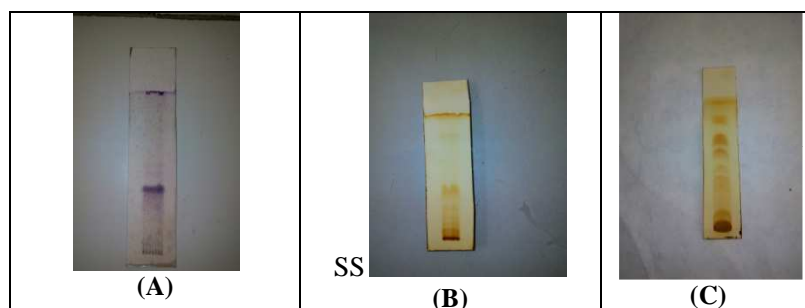
Table 2 shows the results of phytochemical screening of various extracts of *Nuphar luteum* rhizomes.

**Table 2: Results of Phytochemical Screening of Various Extracts of *Nuphar luteum* Rhizomes**

Phytoconstituent	Petroleum Ether Extract	Chloroform Extract	Methanol Extract
Alkaloids	-ive	+ive	+ive
Anthraquinone glycosides	+ive	+ive	+ive
Cardiac glycosides	+ive	+ive	-ive
Terpenoids	-ive	+ive	+ive
Steroids/Triterpenoids	-ive	-ive	-ive
Saponins	-ive	-ive	+ive
Flavonoids	-ive	-ive	+ive
Coumarins	-ive	-ive	-ive
Tannins and phenolic compounds	-ive	-ive	+ive
Proteins	-ive	-ive	+ive
Amino acids	-ive	-ive	+ive
Carbohydrates	-ive	+ive	+ive
Vitamin C	-ive	-ive	+ive
Starch	-ive	-ive	+ive

**Present:** (+ive), **Absent:** (-ive)

Plate 2 shows the representative photographs of TLC fingerprint profiles (silica gel G) of petroleum ether extract (A), chloroform extract (B) and methanol extract (C) of *Nuphar luteum* rhizomes.



**Plate: 2**

**Table 3: TLC Fingerprinting of Various Extracts of *Nuphar luteum* Rhizomes**

Extracts	Solvent System	Visualization	Rf Values
Petroleum ether extract	Toulene : acetone 9 : 1	Anisaldehyde sulphuric acid reagent	0.39, 0.49, 0.54
Chloroform extract	Chloroform : ethylacetate 6 : 4	Iodine vapours	0.07, 0.12, 0.17, 0.23, 0.38, 0.82
Methanol extract	Chloroform : ethylacetate 6 : 4.4	Iodine vapours	0.10, 0.30, 0.34, 0.38, 0.46, 0.58, 0.69, 0.82, 0.87, 0.94

## DISCUSSIONS

The phytochemical screening of petroleum ether extract showed the presence of anthraquinone and cardiac glycosides whereas chloroform extract along with anthraquinone and cardiac glycosides showed presence of alkaloids, terpenoids and carbohydrates. Maximum diversity of chemical constituents were present in methanol extract that includes alkaloids, anthraquinone glycosides, terpenoids, saponins, flavonoids, tannins and phenolic compounds, proteins, amino acids, carbohydrates, starch and vitamin C as shown in table 2. TLC fingerprinting of petroleum ether, chloroform and methanol extract showed impressive results as shown in plate 2 and table 3. Methanol extract contains maximum number of components.

## CONCLUSIONS

The phytochemical screening and TLC fingerprinting reveals that various extract of rhizomes of *Nuphar luteum* contains potential phytoconstituents. Maximum numbers of constituents were present in methanol extract followed by chloroform and then petroleum ether extract of *Nuphar luteum* rhizomes.

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